SHORT REPORT

Capacity building and enhancing knowledge of the healthcare providers on inappropriate practices and dispensing of antimicrobials

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Abstract

This paper reports on the training programme, aimed for healthcare providers on the concepts of antimicrobial resistance (AMR) and build their understanding and knowledge on the causes and factors contributing to the AMR hence reducing the burden on the healthcare systems. A team of experts developed the curriculum and teaching material. A 2-day training workshop was conducted which included the pre- and post-knowledge assessment of the participants on AMR. Four hundred frontline healthcare workers (HCWs) from public and private hospitals were enrolled for the training. Three types of educational material were produced and used; a guidance booklet, documentaries on AMR, and a set of PowerPoint presentations to explain the AMR and its link with one-health and overall importance. Participants' knowledge increased from 60 to 90 percentage points after the training. Study concluded that the knowledge on AMR among HCWs would positively improve their prescribing and dispensing practices.

Keywords: Stewardship, One-health, AMR, infections, microbes.

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Introduction

According to the World Health Organization (WHO), Antimicrobial resistance (AMR) endangers the effective treatment and prevention of an ever-increasing range of infections that can be caused by viruses, bacteria, parasites, and fungi. AMR occurs when these microbes change over time and do not respond to the medicines, making infections harder to treat, increasing the risk of disease spread, severe illness, and death. Consequently, these medicines become less effective and infections continue to persist in the body, increasing the risk of harming others.[1] AMR is a threat to global health particularly in Low and Middle-income countries (LMICs) where the disease burden is heavy. Inappropriate prescribing and dispensing practices have been contributing to an increase in the threat of AMR. In 2015, WHO launched a Global Action Plan (GAP) which contains the antimicrobial stewardship (AMS) interventions that are yet to be implemented and tested in the LMICs.[2] In such settings, several compounding factors can contribute to the emergence of AMR. Due to the limited access to safe water, adequate hygiene and sanitation facilities, self-medication practices, not following the prescribed time for antibiotics intake, lack of law enforcement on the availability of over-the-counter medicines, and absence of awareness on the subject under discussion it is difficult to implement Infection, Prevention, and Control (IPC) and AMS interventions.[3]

AMR is a problem that affects humans, the environment, and animal health. One health originated in the 19th Century when Rudolf Virchow introduced "zoonosis" which displays the link between human and animal health. In 2019, the World Health Organization (WHO) identified 32 antimicrobials in hospital development, of which only six were classified as innovative.[4] Currently, infections caused by antimicrobial-resistant microorganisms are difficult to treat because antimicrobials are increasingly ineffective against these infections resulting in higher mortality rates. New antimicrobials are required to control infections caused by the major pathogens outlined by the WHO.[4]

Research, collaboration, and knowledge exchange are crucial for global efforts to combat AMR. The intervention and actions of multiple factors and their implementation toward the optimal use of antibiotics are called antimicrobial stewardship. Regardless of the increasing need for these interventions and continued efforts, the use of the One-Health approach in addressing AMR stewardship has been minimal.[5]

In addition, the economic burden due to AMR is difficult to calculate because of the insufficient data. It is also important to account for externalities. Yearly, 700,000

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deaths are reported due to drug-resistant microbes and 230,000 deaths are due to resistant mycobacteria. This figure is expected to increase to 10 million by 2050 if no action is taken. The World Bank projects that by 2030, 24 million people can fall into extreme poverty due to AMR and most of them could be from LMICs.[6] Due to global consequences, AMR is being termed as a pandemic as it is listed among the top ten global health concerns. This increase has necessitated the emergence and implementation of approaches to manage this issue globally,[7]

This programme was undertaken to train the healthcare workers on the concepts of antimicrobial resistance, address the knowledge gaps and promote ethical prescriptions for antimicrobial use, which was essential for combatting the emerging trends of the national and global burden due to the ever-evolving microbes.

Methods

This was a comparative study which included four hundred participants comprising of nurses, medical doctors, and frontline health workers were included in this study, hence the universal sampling were adopted. These trainings were conducted from 10-17th November, 2023 in four groups at Health Services Academy (HSA) Islamabad Pakistan. The pre-test was conducted on a validated, piloted questionnaire including ten questions which included; Knowledge of AMR, its global situation, stewardship, individual's contribution towards AMS, Occurrence AMR, one health concept, effect of agriculture practices of AMR, strategies of AMR in human and veterinary medicine, roles of proper sanitation in AMR and information on superbug.[8] This was followed by two days training and a post-test assessment of the participants. Descriptive analysis was done to compare the pre and post-test assessment results of the participants.

Programme design: The ORIC of Health Services Academy, an established national in-service training, research, and academic institution attached to the Ministry of National Health Services, Regulation, and Coordination, in collaboration with Punjab Employees Social Security Institution (PESSI) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), undertook this training programme. Participants belonging to various fields of medicine and healthcare and from different healthcare institutions as NIH were invited A team of experts in designing and delivering healthcare training developed the curriculum and its accompanying material.[10,11] The Health Services Academy maintained a list of registered participants and those who completed the training, and supported activities throughout from whom written consent was obtained prior to starting of the training.

Training material: Three educational materials were produced: a booklet of curriculum, documentaries, and a set of Power Point presentations to explain the AMR, its burden on health systems, and its importance. The guidance booklet was a reference document for each participant and contained details of AMR that could be practised according to the types of diseases, situations, and needs. The training videos were short documentaries on the history and trends of AMR. The PowerPoint presentation slides had a detailed description and in-depth knowledge about Antimicrobial Resistance and how it has influenced and impacted the Healthcare Systems and Models, government and private sectors, and what the national action plans and global action plans strategized to lower the burden due to the AMR.

All questions were attempted by the participants in the pre and post-test questionnaire (Figure 1).

Details of the tool: The ten questions included; Knowledge of AMR, its global situation, stewardship, individual's contribution towards AMS, Occurrence AMR, One health concept, effect of agriculture practices of AMR, strategies of AMR in human and veterinary medicine, roles of proper sanitation in AMR and information on superbug.

The study was approved by the Institutional Review Board (IRB) of Health Services Academy Islamabad, Pakistan via letter No. 20-10/2023-omi/HSA-009, dated 2nd November 2023.

Results

The training was given to the four hundred healthcare workers and public health practitioners. More than half 220 (55%) participants were females and all were working with health departments of different provinces of the country. Average age of the training participants was 31±5.2 years and 284 (71%) had working experience of more than 10 years in public sector hospitals. All questions were attempted by the participants in the pre and post-test questionnaire (Figure 1).

This training was found highly successful as the knowledge of the participants improved from 60 to 90 percentage after the training (Figure 2). This showed the enhancement of knowledge after the training session. The results supported the recommendation, that such training sessions can produce more knowledgeable healthcare professionals concerning AMR strategies and decision-making.

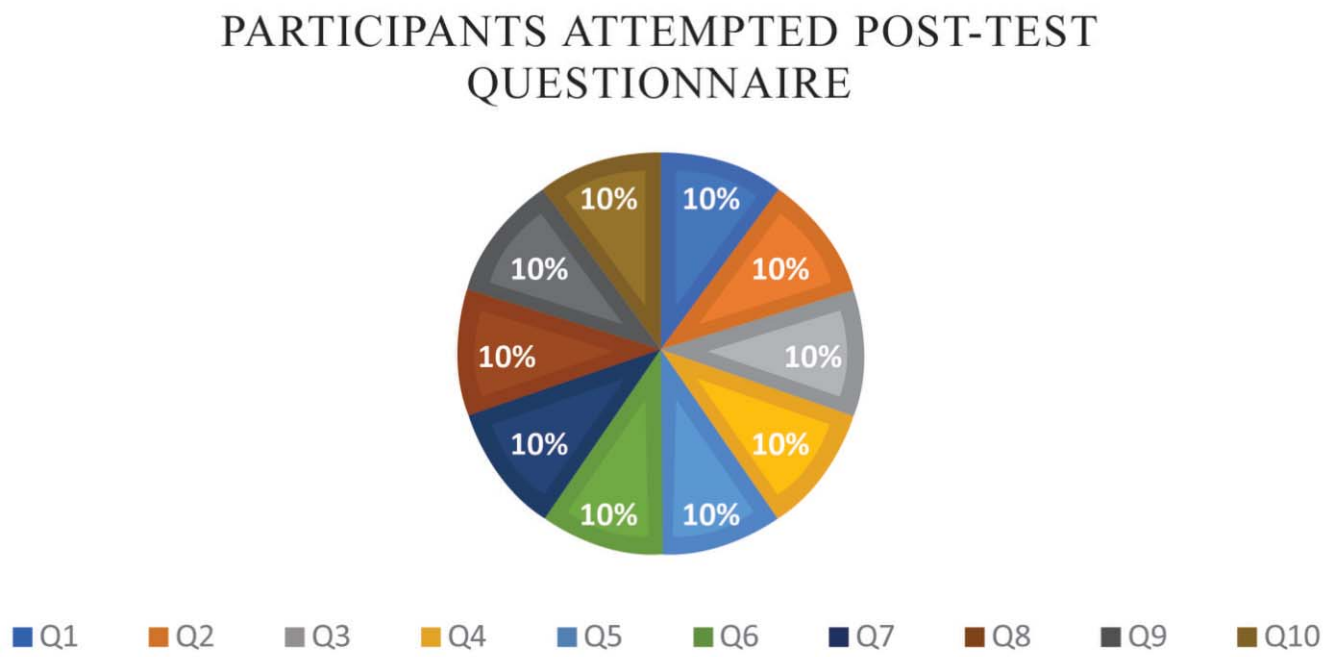

Figure-1: Number of questions attempted by the participants.

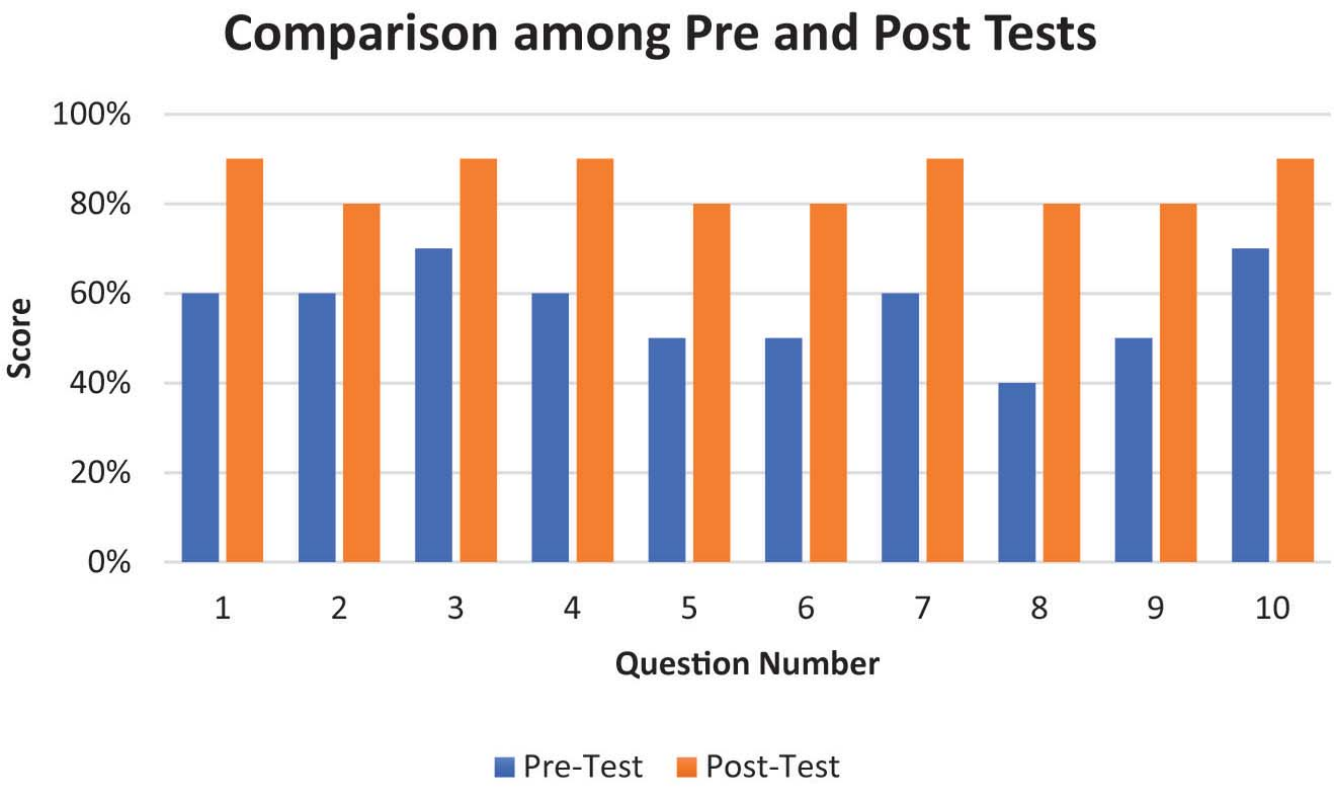

Figure-2: Comparison of pre and post-test scores of the participants.

Discussion

The *increase* in the burden of antimicrobial resistance due to the ever-evolving forms of microbes, has encouraged pharmaceutical companies to change to the next generations of antibiotics. Healthcare staff should have the knowledge on the new and challenging microbes for accurate diagnosis and allocating the finances effectively. Several studies have shown that AMR is a global threat and is listed among the top ten high-burden diseases that contribute to millions of deaths annually. Studies also reveal that there is a need for continued efforts to devise and implement strategies that could lower the malpractices of antibiotic prescribing and dispensing.[13,14]

This training increased the Knowledge of AMR, its global situation, stewardship, individual's contribution towards AMS, Occurrence of AMR, One health concept, effect of agriculture practices on AMR, strategies of AMR in human and veterinary medicine, roles of proper sanitation in AMR and information on superbug. These results are also supported by the study showing the importance of one health approach for AMR.[15] Another study also supports our findings and proved that the training can enhance the knowledge on AMR among the medical students.[16] A mixed-method study from Ghana was also designed to assess the change in awareness regarding antimicrobial stewardship among healthcare workers in a tertiary care hospital.[2] Another intervention study has also proved a positive impact of trainings on the awareness of AMR.[17] It is evident that there is a dire need for a coordinated action plan to overcome the situation and put an emphasis on the interconnected role of agriculture, the environment, and policy interventions for better management of AMR in the country. Hence, the government needs to implement one-health concept, which unites several sectors such as the production of food, the environment, and the health of land, marine, and human populations to maintain better health standards.

There is an urgent need for effective AMS programmes, patient education, and awareness campaigns about AMR and educational interventions at the community level. Along with this, continued training sessions of the Healthcare providers (HCPs) and public health practitioners are important factors that have to be promptly addressed.[18] This has been proved by the study by Kumar et.al. which showed that the financial, transportation and security related barriers were commonly reported by health workers in rural Pakistan.[19] Social and mental stigma is also affecting the antimicrobial prescriptions of drugs for the patients suffering from other viral infections has been shown in a study by Naeem et.al.[20]

Conclusion

The two-day training session aimed at enhancing the knowledge of the healthcare providers regarding AMR, AMS, and One-Health. The training also focussed on the coordination of these sectors at the policy level to bring improvement in health outcomes. Expert insights shed light on critical aspects of antimicrobial resistance and to combat its implications effectively, it was suggested that robust stewardship programmes should be implemented. These would optimize the usage of existing drugs and help in developing new antimicrobial agents. Most important was improving infection prevention and control measures.

Recommendations

This study showed that the knowledge on AMR among healthcare workers could positively improve their prescribing and dispensing practices. Hence, the policy makers should focus on the regular training of AMR for healthcare workers at national level. The progression of antimicrobial resistance through focused efforts on the local, national, and international levels should be encouraged, as this will safeguard the efficacy of the existing antibiotics for the next generations.

Limitations: The generalizability of the short report's findings may be limited due to the reliance on a universal sample, which may not accurately represent diverse perspectives or experiences of specific sub-populations.

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Conflict of Interest: None.

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